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TITLE: Dual Electron Spectrometer for Magnetospheric Multiscale Mission: results of the comprehensive tests of the Engineering Test Unit

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ABSTRACT BODY: The Magnetospheric Multiscale mission (MMS) is designed to study fundamental phenomena in space plasma physics such as a magnetic reconnection. The mission consists of four spacecraft, equipped with identical scientific payloads, allowing for the first measurements of fast dynamics in the critical electron diffusion region where magnetic reconnection occurs and charged particles are demagnetized. The MMS orbit is optimized to ensure the spacecraft spend extended periods of time in locations where reconnection is known to occur: at the dayside magnetopause and in the magnetotail. In order to resolve fine structures of the three dimensional electron distributions in the diffusion region (reconnection site), the Fast Plasma Investigation's (FPI) Dual Electron Spectrometer (DES) is designed to measure three dimensional electron velocity distributions with an extremely high time resolution of 30 ms. In order to achieve this unprecedented sampling rate, four dual spectrometers, each sampling 180 x 45 degree sections of the sky, are installed on each spacecraft. We present results of the comprehensive tests performed on the DES Engineering & Test Unit (ETU). This includes main parameters of the spectrometer such as energy resolution, angular acceptance, and geometric factor along with their variations over the 16 pixels spanning the 180-degree tophat Electro Static Analyzer (ESA) field of view and over the energy of the test beam. A newly developed method for precisely defining the operational space of the instrument is presented as well. This allows optimization of the trade-off between pixel to pixel crosstalk and uniformity of the main spectrometer parameters.

(No Image Selected)